ABSTRACT OF THE DISCLOSURE

An interferometric fiber optic encoder readhead for sensing the displacement of a scale grating is disclosed. The detector channels of the readhead are fiber optic detector channels having respective phase grating masks. The fiber optic encoder readhead is configured to detect the displacement of interference fringes arising from the scale grating. In various exemplary embodiments, the fiber optic readhead is constructed and operably positioned according to various design relationships that insure a compact mounting and a relatively ideal sinusoidal signal as a function of displacement. Accordingly, high levels of displacement signal interpolation may be achieved, allowing sub-micrometer displacement measurements. The fiber optic encoder readhead may be assembled in a particularly accurate and economical manner and may be provided in a package with dimensions on the order of 1-2 millimeters.